



Our Reference: VTE-120-A

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Jeff Moler  
Serial Number: 10/067,762  
Filing Date: February 6, 2002  
Examiner/Art Group Unit: Dougherty, Thomas M./2834  
Title: APPARATUS FOR MOVING A PAIR OF OPPOSING  
SURFACES IN RESPONSE TO AN  
ELECTRICAL ACTIVATION

DECLARATION UNDER 37 C.F.R. §1.132

Mail Stop:  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, John Bugel, do hereby declare that:

1. I am one of the inventors of U.S. Patent Application Serial No. 10/107,951, which involves technology similar to the present U.S. Patent Application Serial No. 10/067,762.
2. I am currently the Sr. Principal Engineer providing supervisory responsibility for the mechanical development of products for Viking Technologies L.C. Viking Technologies is a research and development facility established to commercialize new technologies, and is the assignee of patent rights in both of the above identified applications.
3. I hold a Bachelor's of Science Degree in Ocean Engineering from Florida Atlantic University and am a registered Professional Engineer with the state of Florida.
4. I have over 26 years of experience in the development of fluid system instrumentation, including valves, actuators, sensors, transducers, and positioners.
5. During my career I have developed a current to pressure transducer that employed the use of a piezo-electric bender element in the pilot section of the pressure generator prior to my activities at Viking.
6. I have reviewed U.S. Patent No. 4,570,095 issued to Uchikawa on February 11, 1986 for a mechanical amplification mechanism combined with piezo-electric elements. The Uchikawa reference specifically states at Column 5, Lines 30-35 that the theoretical deflection (i.e. the stroke distance) of the printing needle 9 becomes about 1.0 mm. Since this theoretical deflection is somewhat reduced due to the deformation loss of both the lever arms 5 and 6 and the base 2, the actual deflection is about 0.6 mm.

7. The claimed invention in the present application serial number 10/067,762 is more rigid than the Uchikawa reference, and provides a loss of less than the 40% loss taught by the cited reference of Uchikawa.

8. The analysis of loss for the present invention is based on both finite element analysis (FEA) and actual test measurements of a number of actuator configurations covered under the present patent application. The FEA and test measurements were performed by myself and persons under my supervision, and I have reviewed the results and can certify that the data is an accurate representation for the loss for the present invention.

9. The FEA and test measurements were conducted comparing the theoretical deflection (i.e. stroke distance) to the movement of the arms with respect to one another (excluding the additional band spring 10 movement of the Uchikawa reference). For purposes of comparison, it should be noted that the estimated loss for Uchikawa arm movement is believed to be greater than 40% loss.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By: \_\_\_\_\_



John A. Bugel, PE

Date: August 1, 2003